

Climate Change Adaptation Advisory Committee

Overview for the Massachusetts Legislature on Climate Change Adaptation

Presentation Title: Presentation by the Human Health and Welfare Subcommittee

Date of Presentation: 9 December 2009

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CLIMATE CHANGE ADAPTATION

An update to the MA Legislature



HUMAN HEALTH and WELFARE

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HUMAN HEALTH & WELFARE

Key Sectors

 **Public Health Infrastructure**

 **Air Quality**

 **Water Quality/Sanitation**

 **Agriculture & Food Systems**

 **Forest Pests & Human Health**

 **Winter Weather Anomalies**



CATEGORY	TOPICS
Public Health	Infrastructure, vector-borne diseases, heat stress, allergens, respiratory & cardiovascular diseases, extreme & anomalous weather events
Air Quality	Ambient and indoor air quality
Water Quality/Sanitation	Drinking water, harmful algal blooms, wastewater, water-borne diseases
Agriculture and Food Systems	Crops & livestock, water demand, pesticide use, new or invasive pests, food-borne illnesses
Vulnerable Populations	Food security, pesticides, allergens, air & water quality, VBDs, recovery from extreme weather events



SUBCOMMITTEE MEMBERS



Representatives from

- Department of Public Health
- Department of Environmental Protection
- Department of Food and Agriculture
- Department of Energy Resources
- Tufts University
- UMass Amherst
- Harvard University
- Alternatives for Community and Environment
- Chelsea Greenspace and Recreation Committee
- Massachusetts Emergency Management Agency
- Board of Library Commissioners
- NESCAUM
- City of Boston
- State Fire Marshall's Office
- State Veterinarian



ADAPTATION

a definition parsed for Human Health and Welfare



Measures to

minimize harmful or adverse impacts on human well-being resulting from climatic changes that will occur both incrementally over time and through individual extreme events.



KEY VULNERABILITIES

Sector	Sea Level Rise		Increased Temperatures	Changing Precipitation Patterns		
	Flooding	Saltwater Intrusion		Flooding	Drought	Extreme Weather
Public Health Infrastructure	x	x	x	x	x	x
Vector-Borne Diseases	x		x	x	x	x
Ambient Air Quality			x	x	x	
Indoor Air Quality	x		x	x		
Water Quality	x	x	x	x	x	x
Agriculture & Food Systems	x	x	x	x	x	x
Vulnerable Populations	x	x	x	x	x	x



MAJOR THEMES

- Add climate impact lens to current planning
- Continue & add to structured assessments of vulnerabilities
- Continue to improve emergency response (local & regional)
- Promote healthy & resilient cities



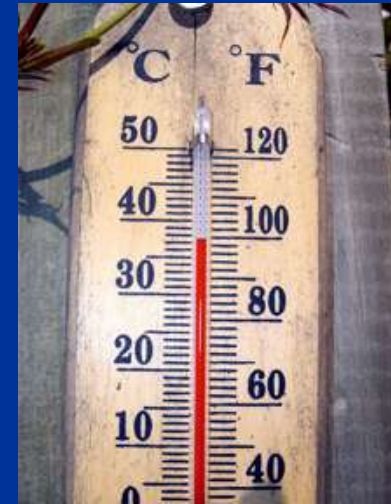
MAJOR THEMES *(cont.)*

- Minimize harm to most vulnerable
- Increase research & improve forecasting
- Support public health monitoring, tracking & surveillance efforts
- Develop communication, education & outreach programs
- Support regionalized Board of Health authority*



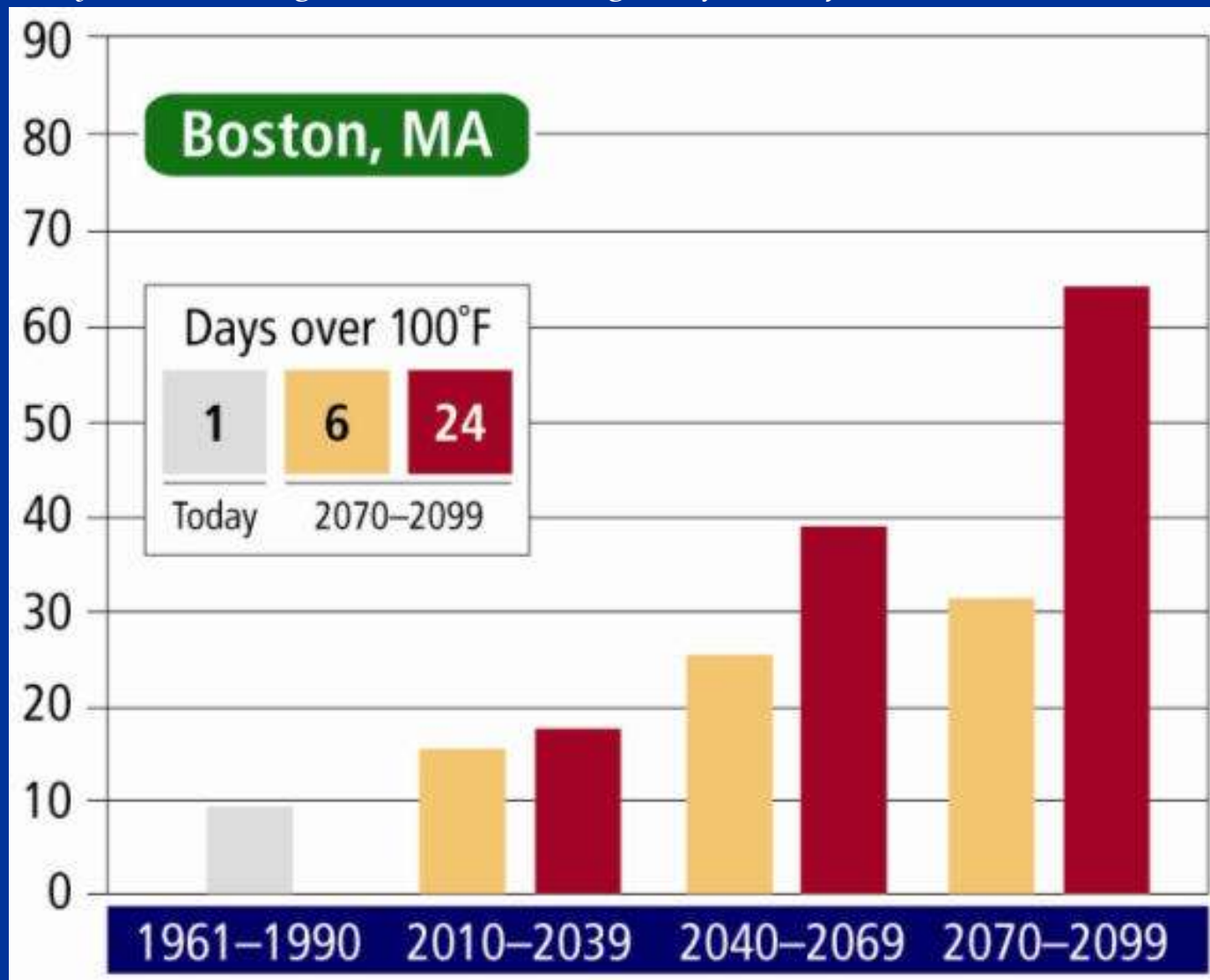
EXPECTED HEALTH IMPACTS: HIGHER TEMPERATURES

- Heat waves & surges
- Urban Heat Island Effect
- Aggravation of some health conditions (asthma, cardiovascular illness)
- Decreased air quality (smog, particulate, ozone, increased pollen counts) for all



EXTREME HEAT DAYS

Hayhoe, et al., Regional Climate Change Projections for the Northeast (2008)

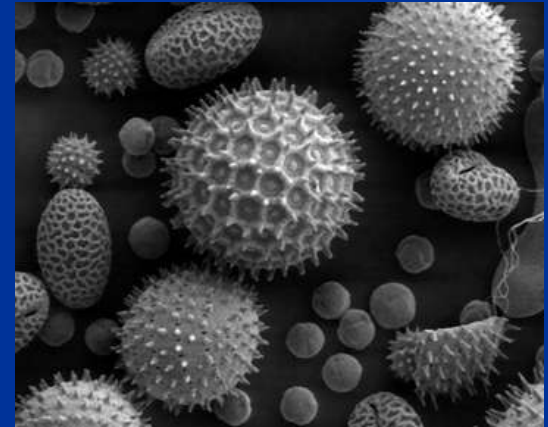


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EXPECTED HEALTH IMPACTS: HIGHER TEMPERATURES

- Increased plant growth, pollen production & allergenicity (CO₂ & T)
- Drought: limiting water supplies
- Higher rate of evapotranspiration, increased agricultural irrigation demand
- Changes to some optimum crop ranges: local food production



MAJOR THEMES *(Cont'd)*



Support Food Systems/ Agricultural sector to improve:



- Water management for both drought & intense precipitation events
- Erosion control



Pest & disease (blight)
management



- Crop selection
- Small Farm resiliency



EXPECTED HEALTH IMPACTS : FLOODING

- Damage to shelters, residences, hospitals
- Potential increase in water-borne diseases
- Compromised water quality from pesticides, stormwater, bacterial & viral contamination
- Longer breeding season for some disease carrying vectors like mosquitoes
- Increased mold growth (indoor & out)
- Power & water supply interruptions due to extreme events*
- Crop & forest damage



UNIFYING THEMES

- Adaptive efforts will be iterative: Start now, use future research & information to reevaluate risk, adjust course & investments
- Public awareness & communication are key to preparedness & response
- Some populations are more vulnerable: those with
 - Health pre-dispositions (asthma, cardiovascular disease)
 - Limited resources
 - Geographic risk: proximity to coast or flood zones
- Emergency response: Local & state officials need access to information, vulnerability assessments, resources & support

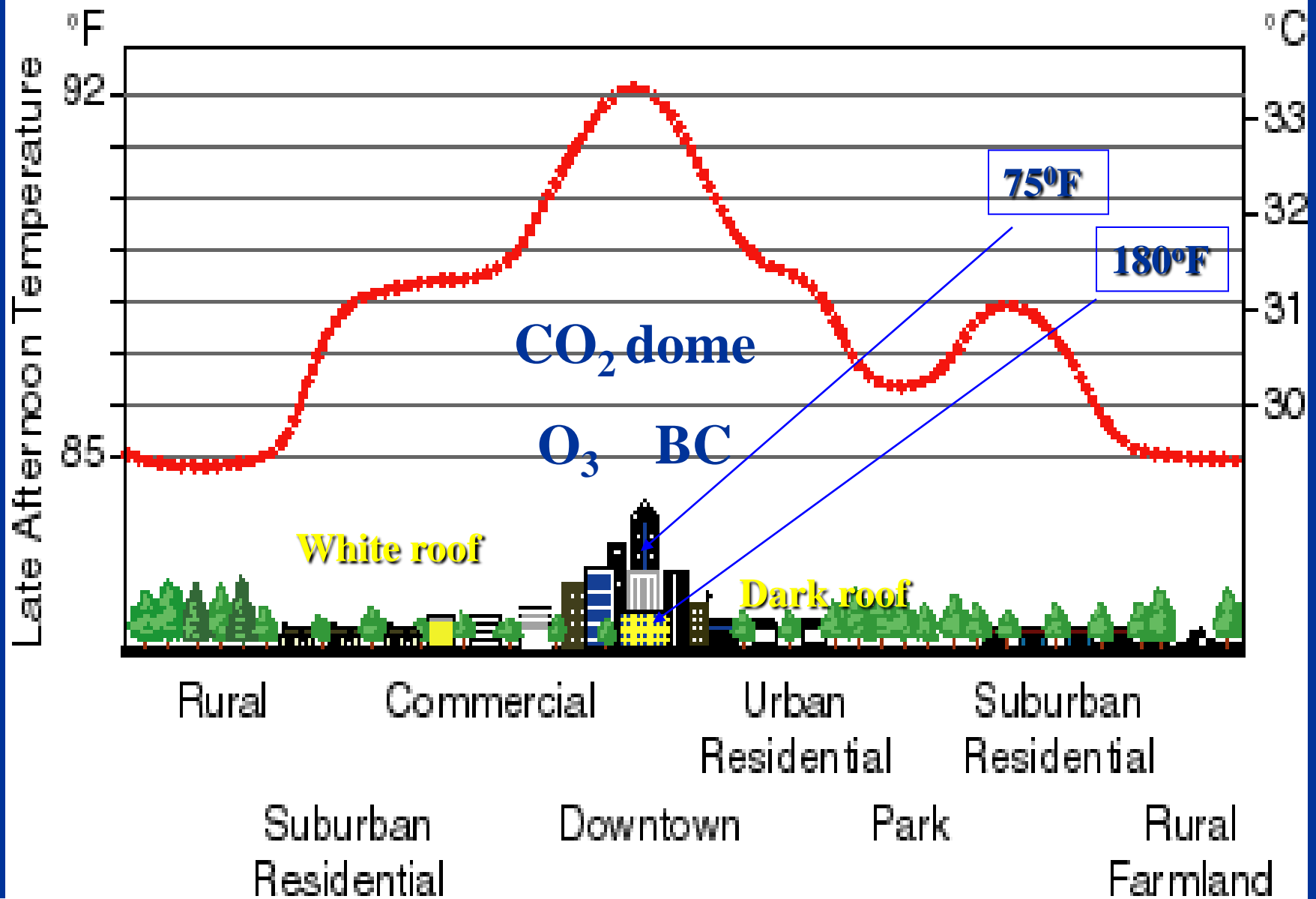


WHAT ABOUT MITIGATION?

- Healthy **MITIGATION** strategies are often healthy **ADAPTATION** strategies!
- Implement **mitigation** strategies that reduce emissions of particulates & ozone precursors to **improve air quality**
- Screen climate **mitigation** strategies through the health & environmental lens, to **minimize unintended consequences** and maximize co-benefits*
- Support **healthy city &** regional planning in areas of energy, transport, food, & green infrastructure to promote healthy living & maximize natural responses



Sketch of an Urban Heat-Island Profile



HUMAN HEALTH & WELFARE STRATEGIES



PUBLIC HEALTH INFRASTRUCTURE



Increase **access to health insurance & medical care, medical support equipment & medications**



Increase **support for hospitals & health centers** expected to bear disproportionate share of service demands



Conduct **outreach & education** to connect individuals & families to appropriate services



PUBLIC HEALTH INFRASTRUCTURE (Cont'd)



Planning, Policy & Governance

- Conduct public health climate change **planning** to identify most vulnerable facilities & improve response capacity
- Conduct **capacity assessments** of care providers for increased patient volumes & changing health demands
- Promote an **education campaign** to address vulnerabilities of system, individuals & institutions



PUBLIC HEALTH INFRASTRUCTURE (Cont'd)



Facilities

- **Modify facilities** to improve flood control protection, relocate at-risk structures away from coast, flood plains
- Use **distributed sources of energy** generation to increase preparedness, resiliency, surge service capacity ✖
- Plan for physical facilities needed for **heat wave preparedness**: health services & cooling centers
- **Note: Disproportionate nighttime warming**



PUBLIC HEALTH INFRASTRUCTURE (Cont'd)



Services

- Promote workforce development to **train public health staff** to respond to health threats posed by climate change
- Implement DPH **Asthma Action Plan** to improve our ability to adequately treat chronic asthma with effective care plans
- Improve **surge capacity**, to ensure adequate staffing, training & supplies for treatment and prevention
- Increase access to **health insurance & medical care**, including medical support equipment & medications



VECTOR-BORNE DISEASE



Surveillance, Monitoring, Mapping & Reporting

- Streamline & automate **reporting mechanisms** including web-based systems
- Maintain & improve **surveillance**
- Develop a statewide systematic **tick surveillance** program
- Utilize “climate services” -- **climate forecasting & remote sensing** for health early warning systems



Communication, Education & Pest Management

- Educate the public, particularly high risk groups, about **personal prevention practices**
- Develop strategies for large scale use of **integrated pest management** control to reduce pesticide use



AMBIENT AIR QUALITY



Standards and Controls

Require controls to attain **air quality standards** for ozone precursors & other asthmogens (pollen and fungal spores)

Develop & enforce legal standards that reduce allowable **limits on asthmogen** releases



Surveillance and Tracking

Build on existing public health practice of surveillance & health outcome tracking to identify & monitor health impacts



Communication and Assistance

Provide technical advice & communicate the health-related aspects of climate change

Provide technical & financial support to companies to reduce their ambient air emissions: **ozone and particulates**



INDOOR AIR QUALITY

- Educate & assist property owners in floodplains to adopt methods to reduce damage or relocation
- Increasing use of green infrastructure
- Strengthen & enforce laws to protect tenants & require property owners to remediate mold
- Continue research & development of building components that have low environmental impacts.



WATER QUALITY

- **Monitoring and Evaluation**

- Continue to monitor **water-borne diseases**
- Work with local communities to assess vulnerability of **water supply quantity and quality from increased peak flows and flooding** & support responses



- **Improve Standards**

- Improve **water management & stormwater standards** to prepare for changes in volume, flow & quality
- Implement better control of **agricultural, urban & stormwater runoff** to prevent contamination, excessive nutrient enrichment & harmful algal blooms
- Promote & adopt natural flood control systems, low impact development techniques



WATER QUALITY (Cont'd)

- **Responsive Capacity**

- Encourage or require **public drinking water systems** to evaluate climate risks to system & health and consider a variety of risk reduction strategies
- Use **climate forecasting & remote sensing**: climate services being developed by NOAA

- **Promoting Water Conservation and Reuse**

- Provide technical & financial support to individual property owners to promote the adoption of water conservation practices & reuse to improve recharge



WINTER WEATHER ANOMOLIES

VARIABILTY

- Freeze-thaw cycles
- Ice Storms
- Fog
- Infrastructure
- Municipal expenses



Ambulatory & Travel Hazards: Orthopedic Injuries, MVAs, MIs

FOR DISCUSSION PURPOSES ONLY - NOT TO BE CITED

AGRICULTURE & FOOD SYSTEM



- Iterative agricultural response can be built from
 - Research on new crops
 - Outreach on Integrated Pest Management & soil and water conservation
 - Loans/financial assistance for livestock & infrastructure changes



AGRICULTURE & FOOD SYSTEM (Cont'd)



- Monitoring and Tracking
 - Continue to monitor food supplies & food borne illnesses for potential disease outbreaks
 - Monitor for new insects, weeds & pathogens that are likely to expand their range into Massachusetts



AGRICULTURE & FOOD SYSTEM (Cont'd)

- Financial Assistance and other Incentives
 - Financial/technical support for irrigation, drainage, livestock facilities, transitioning to new crops at appropriate scales
- Modify subsidy eligibility criteria to ensure access to healthy foods
 - Provide support to assist small farms to bring produce to new markets. In urban areas this may include support for participation in community supported agriculture by low income families
- Provide disaster assistance or insurance for small farms
 - Provide technical assistance & outreach with existing federal programs



AGRICULTURE & FOOD SYSTEM (Cont'd)

- Pesticide Management
 - Revisit integrated pest management thresholds & strategies
 - Increase educational efforts for pesticide risk management, crop adaptation & management, & conservation practices
 - Increase efforts to monitor the use & occurrence of pesticides
 - Improve state level health & safety laws relating to pesticide/herbicide exposure prevention
 - Encourage adoption of best practices to control runoff of pesticides as well as nutrients, fertilizers & soil that contribute to poor water quality
 - Increase/improve support for & enforcement of federal & state OSHA laws relating to pesticide exposure.



AGRICULTURE & FOOD SYSTEM (Cont'd)

- Standards
 - Support increasing access to places to purchase fresh food
 - Improve & enforce water quality protections for water bodies that are used for subsistence fishing
- Partnerships and Outreach
 - Develop partnerships with federal & state programs for planning & program operations
 - Conduct outreach & education targeting vulnerable population groups & their employers about health & safety precautions



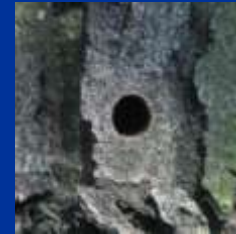
FOREST HEALTH

- Promote intact diverse forests: fires, watersheds
- Monitor for:

Woolly adelgid: Eastern hemlocks



Asian longhorned beetle: maple & other deciduous



Beech bark disease



HEALTHY SOLUTIONS

- Optimize adaptation & mitigation
- Minimize unintended consequences
- Maximize benefits for health, the environment & the economy



Thank you



Questions?

